

# Series 225 Figure Number System

## Series 225 1 1 2 3 4 5 6 7 8 9 - 10

1. Size	Code	4. Pressure	Code	8. Seat/Liner	Code
2"	02	200 PSI (2"-12") DES*	0	Buna-N	1
2½"	25	<b>285 PSI</b>	<b>5</b>	Neoprene	3
3"	03	150 PSI (14"-24") DES*	6	<b>EPDM</b>	<b>5</b>
to		* Rating refers to DES without a down stream flange. For more information refer to the drawings below and the second bullet point on page 7.			
24"	24			Viton® (275°F)	6
				Viton® (400°F)	P
				EPDM (FDA)	V
				White Buna-N	B

2. Series/Style	Code	5. Disc	Code	9. Actuator	Code
Wafer	J	DI - ENP (2"-12")	2	<b>Handle</b>	<b>2</b>
<b>Lug</b>	<b>K</b>	<b>316 SS</b>	<b>4</b>	Infinite/Lockable (2"-6")	3
Lug Dead End	L	DI - (14"-24")	5	Infinite (8")	4
Lug ASME 300 BC	M	Aluminum Bronze	6	Gear Operator	5
Lug ASME 300 DES	N	Monel®	7	Double Acting	6

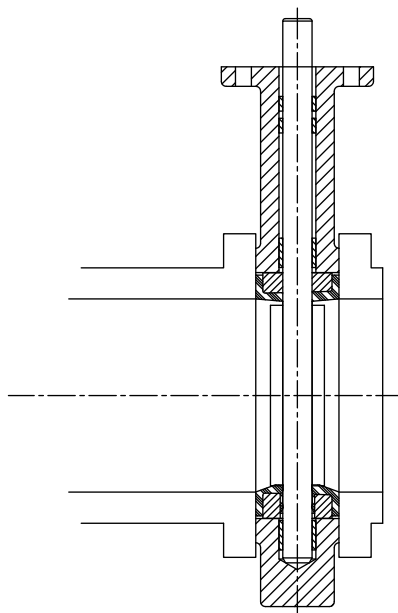
  

3. Body	Code	6. Shaft	Code	10. Special Features	Code
Ductile Iron (A536)	2	416 SS	1	Custom Product	D
<b>Epoxy Coated DI (A536)</b>	<b>V</b>	<b>316 SS</b>	<b>4</b>	CE Marked - Non-Impact Tested	P
Ductile Iron (A395)	G	Monel® (B865-K500 CL-A)	7		
		17-4 PH	9		

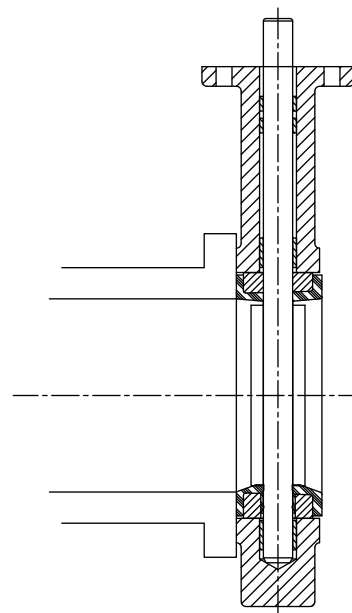
  

7. Bushings	Code
<b>PTFE</b>	<b>3</b>

NOTE: For ASTM designations see Bill of Materials page 9.



With downstream flange



Without downstream flange

## Series 225 – 250 Overview

- Available in sizes 2" to 24".
- Pressure Rating: 285 psi at 100°F. Pressure/Temperature rating above 100°F with downstream flange installed. Available option: Bi-directional dead-end service capability without downstream flange to 200 psi (2" to 12") and 150 psi (14" to 24").
- Available in Wafer or Lug style body.
- Wafer body features four alignment holes.
- Available in ASME Class 300 Lug Body bolt pattern (2" to 12"). Series 225 only.
- Ideal for on-off or throttling services.
- Available with handles (2" to 6"), manual gear operators, electric actuators and pneumatic actuators (2" to 24").
- Refer to Crane automation bulletin for details of pneumatic and electric actuators.
- Compatible with ASME B16.1 Class 125 (Iron) and ASME B16.5 Class 150 (Steel) flanges or optional Class 300 (Steel) Lug only.
- Valves 14" and larger are rated at a maximum 150 psi when a companion flange is not used in dead end service.
- For bolting information, consult the Center Line Installation and Maintenance Manual.
- Vacuum Service Rating: zero leakage at 24" of mercury.
- Commercial cleaning available for Oxygen level 2.
- Type approval certification from ABS for Marine applications (2" to 24").
- CE/PED Certification available for sizes 2" to 24".

### Valve Seating Torques (In-Lbs.)

Valve Size	Standard Disc Differential Pressure				
	50 PSI	100 PSI	150 PSI	200 PSI	285 PSI
2"	136	142	148	154	164
2 ½"	152	160	168	176	189
3"	224	229	234	239	247
4"	380	392	404	416	436
5"	451	477	503	529	572
6"	875	946	1016	1087	1206
8"	1476	1559	1642	1726	1867
10"	2451	2613	2775	2937	3213
12"	3900	4111	4323	4534	4893
14"	5189	5467	5744	6022	6494
16"	10,985	11,569	12,154	12,738	13,732
18"	13,946	14,688	15,431	16,173	17,434
20"	14,695	15,478	16,260	17,043	18,373
24"	29,738	31,321	32,903	34,486	37,176

All torques shown on the chart were derived from test data using water at 60°F. For torques using dry gases, multiply these numbers by 2.0. For torques involving other media, please consult the factory.

There is no safety factor included in the numbers shown on this chart. For actuator sizing, Center Line recommends that these values be multiplied by 1.2 for single valve applications, or 2.0 for 3-way ("tee") applications.

For PTFE seats multiply the numbers shown on this chart by 2.0.

Under certain conditions, hydrodynamic torque can meet or exceed seating and unseating torques. When designing valve systems, hydrodynamic torque must be considered to help assure correct selection for the application.

### Seat Temperature Ratings

Material	Temperature Rating °F
Buna-N	+10 to 180
EPDM (2"-16")	-30 to 275
EPDM (18"-24")	-30 to 225
Abrasive Resistant Buna-N	+10 to 180
Neoprene	+20 to 200
Viton®	+10 to 275
High Temperature Viton®	+10 to 400
PTFE (Series 250 only)	+40 to 250

Although elastomers have an effective operating temperature range, when used in valves, these ranges may have to be modified. The temperature ranges shown in the table have been adjusted accordingly.

**For Low Temperature:** While the seat materials selected for use in Center Line butterfly valves are capable of withstanding lower temperatures without damage, the durometer of the elastomer is changed. This "hardening" of the seat may increase the operating torque beyond the structural limits of the stem and/or the disc to stem configuration.

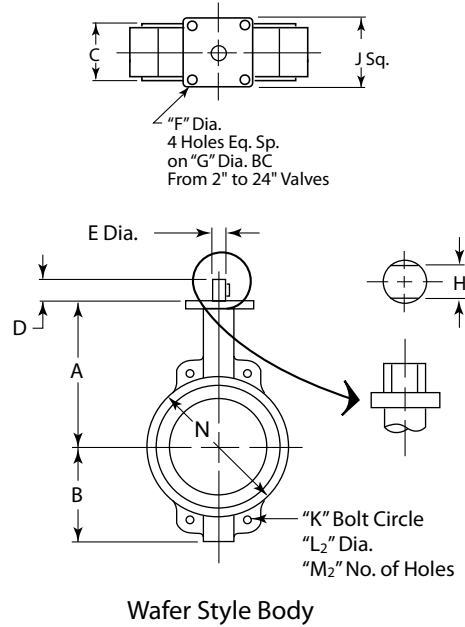
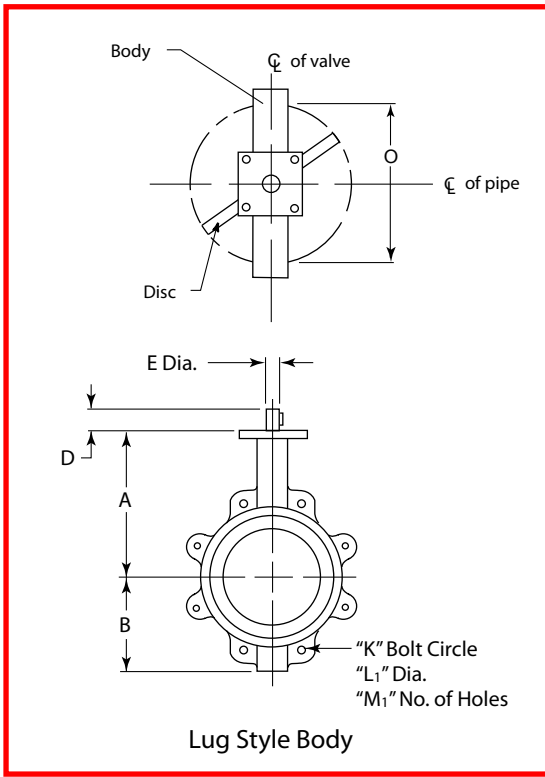
**For High Temperature:** When using High Temperature Viton®, the operating pressure of the valve is reduced above 275°F.

**Field Replacement:** Replacing seats in sizes 14" and above requires factory service.

### C<sub>v</sub> Values – Valve Sizing Coefficients (US-GPM @ 1ΔP)

Size	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	0.06	3	7	15	27	44	70	105	115
2 ½"	0.10	6	12	25	45	75	119	178	196
3"	0.20	9	18	39	70	116	183	275	302
4"	0.30	17	36	78	139	230	364	546	600
5"	0.50	29	61	133	237	392	620	930	1022
6"	0.80	34	94	153	257	422	706	1154	1320
8"	2	56	154	251	422	693	1158	1892	2165
10"	3	87	238	385	654	1073	1794	2931	3353
12"	4	153	417	681	1145	1879	3142	5132	5827
14"	6	183	500	816	1372	2252	3765	6150	7037
16"	8	271	740	1208	2031	3333	5573	9104	10,416
18"	11	318	867	1417	2382	3909	6535	10,676	12,215
20"	14	415	1133	1851	3112	5107	8538	13,948	15,959
24"	22	543	1482	2421	4069	6678	11,165	18,240	20,869

# Series 225 - 250 Dimensions

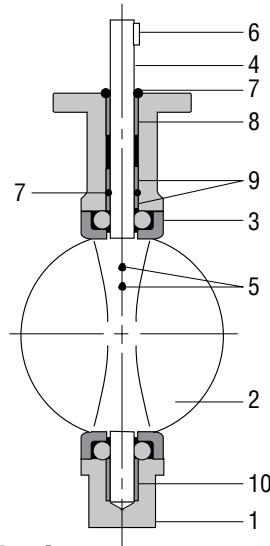


## Dimensions and Weights

For installation and maintenance instructions, please refer to the IOM manual available at [www.cranevalveit.com](http://www.cranevalveit.com)

Inches / mm	A	B	C	D	E	F	G	H	J	K	300# K	L <sub>1</sub>	300# L <sub>1</sub>	L <sub>2</sub>	M <sub>1</sub>	300# M <sub>1</sub>	M <sub>2</sub>	N	Wafer	Lug	300# Lug	O	
2"	6 3/8	3 3/16	1 7/8	1 1/4	1/2	3/8	2.76	0.39	2 3/4	4 3/4	5	3/8-11	3/8-11	1 1/16	4	4	4	4	6 lbs.	9 lbs.	9 lbs.	1.26	
50	161.93	80.96	47.63	31.75	12.70	9.53	70	10	69.85	120.65	127.00			17.46				101.60	2.72 kg	4.08 kg	4.08 kg	32.0	
2 1/2"	6 7/8	3 1/2	2	1 1/4	1/2	3/8	2.76	0.39	2 3/4	5 1/2	5 7/8	3/8-11	3/4-10	1 1/16	4	8	4	4	4 3/8	7 lbs.	13 lbs.	13 lbs.	1.83
65	174.63	88.90	50.80	31.75	12.70	9.53	70	10	69.85	139.70	149.23			17.46				120.65	3.18 kg	5.90 kg	5.90 kg	46.5	
3"	7 1/8	3 3/4	2	1 1/4	1/2	3/8	2.76	0.39	2 3/4	6	6 3/8	3/8-11	3/4-10	1 1/16	4	8	4	5	10 lbs.	14 lbs.	14 lbs.	2.54	
80	180.98	95.25	50.80	31.75	12.70	9.53	70	10	69.85	152.40	168.28			17.46				127.00	4.54 kg	6.35 kg	6.35 kg	64.5	
4"	7 7/8	4 1/2	2 1/8	1 1/4	3/4	3/8	2.76	0.47	2 3/4	7 1/2	7 7/8	3/8-11	3/4-10	1 1/16	8	8	4	7 1/2	19 lbs.	24 lbs.	24 lbs.	3.54	
100	200.03	114.30	53.98	31.75	15.88	9.53	70	12	69.85	190.50	200.03			17.46				158.75	5.90 kg	8.62 kg	10.89 kg	89.9	
5"	8 3/8	5	2 3/8	1 1/4	3/4	3/8	2.76	0.55	2 3/4	8 1/2	9 1/4	3/4-10	3/4-10	1 1/16	8	8	4	9 1/2	18 lbs.	22 lbs.	29 lbs.	4.36	
125	212.73	127.00	60.33	31.75	19.05	9.53	70	14	69.85	215.90	234.95			20.64				190.50	8.16 kg	9.98 kg	13.15 kg	110.7	
6"	8 7/8	5 1/2	2 3/8	1 1/4	3/4	3/8	2.76	0.55	2 3/4	9 1/2	10 3/8	3/4-10	3/4-10	1 1/16	8	12	4	8 3/8	21 lbs.	31 lbs.	38 lbs.	5.74	
150	225.43	139.70	60.33	31.75	19.05	9.53	70	17	69.85	241.30	269.88			20.64				212.73	9.53 kg	14.06 kg	17.24 kg	145.8	
8"	10 1/4	6 7/8	2 1/2	1 3/4	7/8	7/16	4.02	0.67	3 3/4	11 3/4	13	3/4-10	7/8-9	1 1/16	8	12	4	10 3/8	34 lbs.	49 lbs.	67 lbs.	7.63	
200	260.35	174.63	63.50	44.45	22.23	11.11	102	17	95.33	298.45	330.20			20.64				269.88	15.42 kg	22.23 kg	30.39 kg	193.8	
10"	11 1/2	8	2 3/4	1 3/4	1 1/8	7/16	4.02	0.87	3 3/4	14 1/4	15 1/4	1/2-9	1-8	1 1/16	12	16	4	12 7/8	45 lbs.	62 lbs.	100 lbs.	9.54	
250	292.10	203.20	69.85	44.45	28.58	11.11	102	22	95.33	361.95	387.35			23.81				327.03	20.41 kg	28.12 kg	45.36 kg	242.3	
12"	13 1/4	9 5/8	3 1/8	1 3/4	1 1/4	1/2	4.02	0.95	3 3/4	17	17 3/4	1/2-9	1 1/2-7	1 1/16	12	16	4	15 7/8	74 lbs.	105 lbs.	144 lbs.	11.5	
300	336.55	244.48	79.38	44.45	31.75	11.11	102	24	95.33	431.80	450.85			23.81				403.23	33.57 kg	47.63 kg	65.32 kg	292.1	
14"	14 1/2	11	3 1/8	1 3/4	1 1/4	7/16	4.02	0.95	3 3/4	18 3/4	-	1-8	-	1 1/16	12	-	4	17 3/8	109 lbs.	178 lbs.	-	12.81	
350	368.30	279.00	79.38	44.45	31.75	11.11	102	24	95.33	476.25	-			26.99				447.68	49.44 kg	80.74 kg	-	325.4	
16"	15 3/4	12	3 1/2	2	1 5/8	7/8	6.50	1.06	6 1/2	21 1/4	-	1-8	-	1 1/16	16	-	4	20 1/4	135 lbs.	224 lbs.	-	15	
400	400.05	305.00	88.90	50.80	33.34	22.23	165	27	165.10	539.75	-			26.99				514.35	61.24 kg	101.60 kg	-	381.0	
18"	16 3/8	13 1/4	4 1/4	2	1 5/8	7/8	6.50	1.26	6 1/2	22 3/4	-	1 1/2-7	-	1 1/16	16	-	4	21 1/2	190 lbs.	265 lbs.	-	16.87	
450	422.28	336.55	107.95	50.80	41.28	22.23	165	32	165.10	577.85	-			31.75				546.10	86.18 kg	120.20 kg	-	428.5	
20"	18 1/8	14 3/8	5 3/8	2 1/2	1 7/8	7/8	6.50	1.26	6 1/2	25	-	1 1/2-7	-	1 1/8-7	20	-	4	23 3/4	316 lbs.	455 lbs.	-	18.69	
500	479.43	371.48	136.53	63.50	41.28	22.23	165	32	165.10	635.00	-							603.25	143.34 kg	206.38 kg	-	474.7	
24"	22 1/8	18	6 1/8	2 3/4	3	1 1/8	6.50	2.36	6 1/2	29 1/2	-	1 1/2-7	-	1 1/4-7	20	-	4	27 7/8	506 lbs.	702 lbs.	-	22.57	
600	561.98	457.20	155.58	69.85	76.20	22.23	165	60	165.10	749.30	-							708.03	229.52 kg	318.42 kg	-	573.3	

## Series 225 - 250 Materials of Construction



### Bill of Materials (Series 225)

Item	Description	Materials	Optional Materials
1	Body	Ductile Iron (A536 65-45-12)	Ductile Iron (A395 60-40-18)
2	Disc	Ductile Iron† (A536 65-45-12)	<del>Aluminum Bronze (B148-C954), 316 SS (A351-CF8M), Monel® (A494-M30C)</del>
3	Seat	<del>Buna-N</del> or EPDM	<del>Neoprene, Abrasive Resistant Buna-N, Viton®, High Temperature Viton®</del>
4	Shaft	416 Stainless Steel (A582-416)	2"-12": 17-4 PH (A564-630/1150), <del>Monel® (B865-K500-CL-A)</del>
5	Taper Pin	416 Stainless Steel (A582-416)	17-4 PH (A564-630/1150), <del>Monel® (B865-K500-CL-A)</del>
6	Key	Carbon Steel	No Option Available
7	O-Ring	Buna-N	No Option Available
8	Bushing	PTFE	No Option Available
9	Bushing	PTFE	No Option Available
10	Bushing	PTFE	No Option Available

†ENP plated for 2" - 12" valves

### Bill of Materials (Series 250)

Item	Description	Materials	Optional Materials
1	Body	Carbon Steel (A216 GR.WCB)	316SS (A351 GR.CF8M) Carbon Steel (A-216 GR.WCB Impact Tested)*
2	Disc	316 Stainless (A351-CF8M)	Aluminum Bronze (B148-C954), Monel® (A494-M30C)
3	Seat	Buna-N or EPDM	Neoprene, Abrasion Resistant Buna-N, Viton®, High Temperature Viton®, PTFE
4	Shaft	316 SS (A276/A479-316)	17-4 PH (A564-630/1150), Monel® (B865-K500 CL-A)
5	Taper Pin	316 SS (A276/A479-316)	17-4 PH (A564-630/1150), Monel® (B865-K500 CL-A)
6	Key	Carbon Steel	No Option Available
7	O-Ring	Buna-N	No Option Available
8, 9, 10	Bushing	PTFE	No Option Available

\* Center Line Series 250 Carbon Steel valves with CE marking are good to 0°F for non-impact tested bodies and -20°F for impact tested carbon steel bodies. Please refer to page 18 for the correct ordering code.

# Technical Data

The nomograph on the next page gives the relationships of valve size, flow, velocity, and pressure drop for various disc positions.

## Sample Calculation, Liquid (see black line on chart)

### Given:

Water (1.0 specific gravity) at 60°F is flowing through a 6-inch valve at a rate of 1000 gpm.

### Find:

Line velocity (ft./sec.) and pressure drop when valve is in full-open (disc at 90°) position.

### Solution:

From the 6-inch valve size at lower left of nomograph, go diagonally up to the intersecting horizontal line for 1000 gpm. From that point, proceed directly down to determine line velocity as 11 ft./sec.

For pressure drop, return to the 1000 gpm intersection and continue up vertically to "90° disc open" intersecting diagonal line. From this point, go horizontally to the left to determine pressure drop as 0.5 psi.

Size	C <sub>v</sub> at Full-Open
2"	115
2 ½"	196
3"	302
4"	600
5"	1022
6"	1579
8"	3136
10"	5340
12"	8250
14"	11917
16"	16388
18"	21705
20"	27908
24"	43116
30"	73426

## Sample Calculation, Gas (see gray line on chart)

### Given:

Gas (0.8 lb/cu. ft. density) is flowing through an 8-inch valve at a rate of 1500 cu. ft./min.

### Find:

Line velocity (ft./min.) and pressure drop when valve is in full-open (disc at 90°) position.

### Solution:

From 8-inch valve size at lower left of nomograph, go diagonally up to the intersecting horizontal line for 1500 cu. ft./min. From that point, proceed directly down to the bottom line of the nomograph to determine line velocity as 4000 ft./min.

For pressure drop, return to the 1500 cu. ft./min. intersection and continue up vertically to "90° disc open" intersecting diagonal line. From this point, go horizontally to the left to determine pressure drop as 17 psi. Now, convert pressure drop to gas by dividing gas density by liquid density and multiplying by 17.

## General Notes

- Liquid flow data is based on pressure drop and flow rate with viscosity similar to water at 60°F using flow coefficient.

$$\frac{0.8}{62.34} \times 17.0 = 0.22 \text{ psi}$$

- Velocities for liquids with densities similar to water should be less than 16 ft./sec.
- Nomograph flow rate for gases is in cubic feet per minute (CFM) at flowing conditions. To convert flow rate from standard cubic feet per minute to CFM, use the following formula:
- Gas density in lbs./cu. ft. equals:

$$\text{CFM} = \frac{(\text{SCFM} \times 14.7) \times (460 + ^\circ\text{F})}{(\text{line pressure, psia}) \times 520}$$

$$\left( \frac{270 \times}{\text{line pressure, psia}} \right) \times \left( \frac{\text{specific gravity of gas (relative to air)}}{460 + ^\circ\text{F}} \right)$$

## Definitions

**C<sub>v</sub>** = Flow coefficient for valves; expresses flow rate in gallons per minute of 60°F water with 1.0 psi pressure drop across valve.

**K** = resistance coefficient.

$$\mathbf{K} = d \sqrt{\frac{29.9}{C_v}}$$

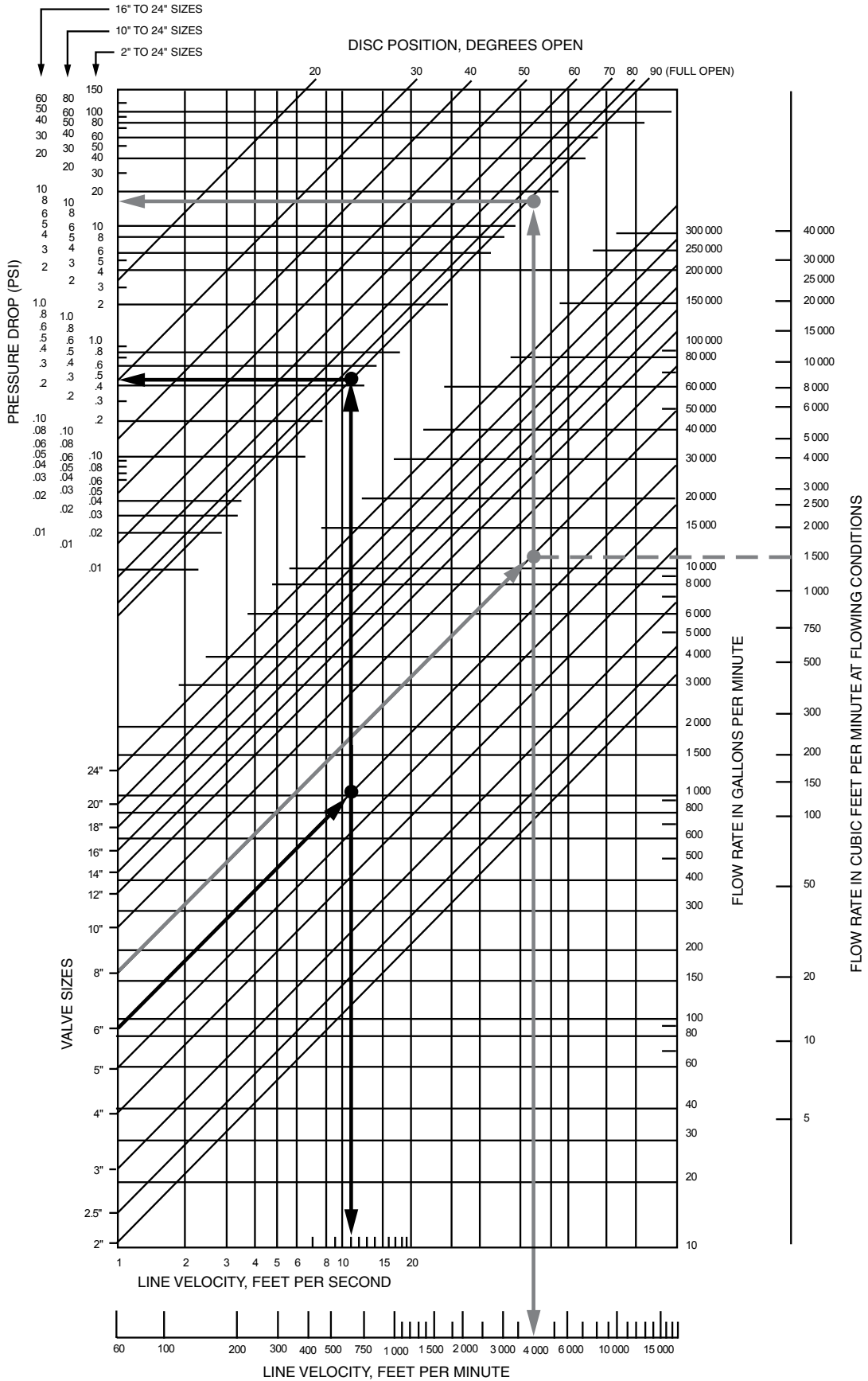
**P** = weight density of fluid, in pounds per cubic foot.

**d** = internal diameter of Schedule 40 pipe, in inches.

**Q** = rate of flow, in gallons per minute.

**ΔP** = differential pressure, in pounds per square inch gauge.

# Technical Data



# Technical Data

## Seat Temperature Ratings and Application Information

Elastomer	Continuous Temp Range	Description
Buna-N	+10°F to 180°F	<p>Also known as Nitrile or NBR. Buna-N is a good, general purpose material for most general services such as water at ambient temperatures, vacuum, compressed air, salt solutions, alkaline solutions and aliphatic h hydrocarbons (saturated and unsaturated).</p> <p><b>Buna-N is not recommended for strong oxidizing agents, nitrated hydrocarbons, Ketones, acetates, phenols, aldehydes or for gasolines with additives. Also, Buna-N can swell in hot water applications, and increase operating torque.</b></p>
EPDM	-30°F to 275°F	<p>EPDM is a synthetic rubber suitable for many general purpose applications with higher temperature requirements. It is acceptable for hot and chilled water, glycols, detergents, phosphate esters, Ketones and alcohols.</p> <p><b>EPDM is not suitable for any hydrocarbon-based oils and lubricants, or in compressed air systems with hydrocarbons.</b></p>
Viton®	+10°F to 400°F	<p>Viton® is a fluoroelastomer with exceptional resistance to oils and chemicals at higher temperatures. Viton® is suitable for hydrocarbons, and has a greater chemical resistance than Buna-N. Viton® can also be recommended for mineral acids, dilute and concentrated solutions and alcohols.</p> <p><b>Viton® is not recommended for higher temperature water and steam applications as it has a tendency to swell. Also, Viton® hardens at the lower end of the temperature range, which can increase operation torque.</b></p>

Crane is please to offer other seat materials upon request. Please consult your sales representative or the factory for availability and application information.

# Handle Features and Dimensions

Handles are available for on/off and throttling control of Center Line resilient seated butterfly valves. These handles can be used for manual actuation of 2" to 12" valves at 200 psi and for 2" to 6" valves at 285 psi. For valves larger than 8", excessive operator effort and extreme handle reaction to internal valve forces are possible. In these cases, a gear operator is recommended for safe operation.

## Features

The rugged construction of Center Line handles makes them ideally suited for manually actuating smaller valves. The latchplate permits the valve to be locked in any of the 10 positions on DIT handles or in any position on IOL handles.

## Specifications

- DIT Mechanically locks the valve in any of the 10 positions from 0° to 90° in 10° increments
- DIT/IOL Can hold the valve in intermediate positions (32°, 68°, etc.) and can also be locked in 0° and 90° positions



## Dimensions and Weights

Valve Size		A	B	Weight	
				DIT	DIT/IOL
2-6	in.	2.25	10.5	1.8	2.0
50-150	mm	57.15	266.7	0.8	0.9
8-12	in.	3.34	14.0	4.0	-
200-300	mm	84.84	355.6	1.8	-

Plates are adaptable for ISO or standard mounting flange.

